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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,917	09/21/2007	Trevor Solomon	13877/10401	1650

26646 7590 11/16/2010
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EXAMINER

WESTERBERG, NISSA M

ART UNIT	PAPER NUMBER
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1618

MAIL DATE	DELIVERY MODE
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11/16/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/585,917	Applicant(s) SOLOMON ET AL.	
	Examiner Nissa M. Westerberg	Art Unit 1618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>3/19/07</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because its length is undue and exceeds the limit of 150 words or less. Correction is required. See MPEP § 608.01(b).

Claim Objections

2. Claim 1 is objected to because of the following informalities: each claim should contain only a single period, which occurs at the end of the claim. Line 14 of claim 1 ends with a period but the claim continues from there. An extra word also appears to be present in line 9 in the phrase "alkali metals metal". Appropriate correction is required.
3. Claim 8 is objected to because of the following informalities: there is a misspelling in line 5 in the word "gramme". Appropriate correction is required.

Claim Rejections - 35 USC § 112 – 2nd Paragraph

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 1 - 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The following phrases found in claim 1 render the meted and bounds of the claim unclear. The rest of the claims fall therewith. Please clarify each of the following issues:

In regards to M, it is unclear what degrees of ionization are encompassed by the claim. The degree of ionization is a measure of the proportion of neutral particles that are ionized into charged particles. The metal complexed to the acrylic backbone of film-forming polymer (A) is required to have "a degree of ionization less than that of the alkali metals metal". These alkali metals exist in the zero oxidation state but when contacted with non-metal such as chlorine, readily gives up the single valence electron and become fully ionized. Thus, it appears that the degree of ionization of the alkali metals can either be 0 or 1. It is unclear if any degree of ionization less than 1 will meet the limitation or if only non-ionized metals are being claimed. Zinc is among the metals disclosed as possible and when used, this component could be considered a biocidal zinc compound but the coating composition is required to be substantially free of such compounds. It is therefore unclear if such zinc-polymers are considered biocidal zinc compounds that would be excluded from the composition.

It is unclear if an n value of 2 only applies to X being the final structure option of a pentavalent phosphorous and/or if such an n value means that the terminal group is X-O-M-R-O-M-R. Silicon is capable of forming such a chain but the majority of the other

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metals are not. Alternatively, an n value of could mean that at least two ends (branched polymers may have more than 2 ends) have such a formula.

It is also unclear which polymers lie within the scope of the claim for polymer (B) because a definition has not been provided for "slightly water-soluble" to separate the polymers that are soluble in water and outside the scope of the claims from those that are only "slightly" soluble and thus encompassed by the claims. Does reactive in water mean that the polymers can be reacted with other compounds, contain side groups such as acid chlorides that react in water and/or that the polymer react with water (e.g., hydrolyze)? As neither "reactive in water" nor "water-sensitive" have been defined so the differences, if any, between these two classes of polymeric materials, is not clear.

The composition is also required to be "substantially free" of both rosin and biocidal zinc compounds. Paragraph 45 of the PGPub of the instant specification states that "substantially free of means that the component in question is not present in such an amount that the properties of the coating composition are detrimentally affected". Detrimental is defined as "obviously harmful" (see attached definition from Merriam-Webster) and it unclear what level of alteration in the properties of the coating composition would meet this limitation. Will any alteration in the properties of the coating composition (e.g., strength, durability, length of time or degree of antifouling activity) be considered obviously harmful or must a certain threshold of change happen before the properties are detrimentally affected?

It is unclear what is meant by the limitation regarding the metallic copper of the copper-based biocide. Do applicants mean that there is less than 2% of copper in the

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zero oxidation state present in the copper biocide? Copper containing compounds may also be described as metallic. The addition of metal ions to a polymer is described as “metalizing” a polymer by Matsuda et al. (US 5,880,173, abstract) so “metallic” can also be used to describe compounds that contain ionized forms of copper. Such polymers may have a copper content of less than 2% but CuO has a copper content of almost 80% by mass, making a composition having no more 2% metallic copper difficult to obtain if all copper is being considered to be metallic.

6. Claims 9 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what the active step(s) of the claims is/are. The active step could be immersion in a fouling aquatic environment so the claims are drawn to a method of use of a product; the active step could be coating with an antifouling coating so the claims are drawn to a method of preparing a structure with an intended use; or that two active steps of coating and immersion are both required. Please clarify.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1 – 5 and 8 -13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. (US 5,880,173).

Matsuda et al. discloses a substrate resin metalized with an organic monobasic acid so that the acid pendant group and organic monobasic acid are both bound to the same metal ion (abstract). The organic monobasic acid copper acetate is exemplified and will provide a carboxylic acid group with the salt form –COOCuOAc (col 2, ln 23 –

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31) in which $n = 1$, X is $-\text{CO}-$, M is Cu, R is $-\text{OR}_1$ and R_1 is a methyl monovalent organic residue. The carboxylic acid monomers can be acrylic or methacrylic acids (col 2, ln 37 – 38) with an acid number (acid value) of between 25 to 350 mg KOH/g of solid (col 2, ln 50 – 55). The polymers are all acrylic acid so the termini of the polymer will have such a formula. The metal forming a salt with the substrate resin are chosen from elements of groups 3A - 7A, 8, 1B and 2B and include zinc, cobalt, nickel, copper, tellurium and manganese (col 3, ln 55 - 58). This reads on the polymer component (A) of instant claim 1. The antifouling paint composition comprises the metal-containing resin and an antifouling pigment and/or antifouling agent (col 1, ln 65 - col 2). The list of antifouling agents includes a number of copper containing biocides such as copper oxides and copper dialkyl dithiocarbamates (col 4, ln 26 – 44). The selection of salts such as zinc, copper or tellurium that have an ionization tendency lower than that of alkali metals results in paint films that will be gradually hydrolysed and dissolved out into weakly alkaline sea water when applied to ships, fish nets or marine construction, (col 5, ln 27 – 33). This gives the film antifouling and other properties for a long period of time and can be used in a variety of ships, marine construction and fish nets (col 5, ln 41 – 48). Particularly when combined with copper-based antifouling pigments such as cuprous oxide or copper rhodanide, the interaction between the vehicle resin and the antifouling pigment is remarkably retarded when compared to resin with the neutral monomer (col 5, ln 51 – 57).

Matsuda et al. does not explicitly prepare a coating composition with both the metalized polymer and a copper-based biocide.

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It would have been obvious to the person of ordinary skill in the art at the time the invention was made to incorporate a copper-based biocide such as cuprous oxide into the resin composition. The person of ordinary skill in the art would have been motivated to make those modifications and reasonably would have expected success because Matsuda et al. discloses that the metalized resin and copper-based biocide are present in the composition. In these formulations, no polymer B (0% based on the weight of the film-forming components). No zero oxide state copper, biocidal zinc compounds or rosin is present in this composition.

It also would be obvious to apply this coating to man-made structures such as fish nets or ships that will be immersed in or exposed to a fouling aquatic environment, thereby protecting the structure from fouling. A low salinity aquatic environment can be found in estuaries or harbors in which fresh water entering, and partially counteracted by the action of the tides) from rivers lowers the salinity as compared the open ocean. A coated structure placed in such an environment would be exposed to varying salinity over time the salinity varies over time based on factors such as the tides and fresh water inputs (e.g., river level and flow rates). Fish nets, also exemplified as a possible substrate by Matsuda, can also be exposed to varying salinity levels as the salinity level of the oceans varies based on the depth. Upon release into the ocean and then lowering into the ocean to catch fish, the coated structure will be exposed to varying salinity levels. If claims 9 and 10 are drawn to method of preparing the structure, then the salinity of aqueous environment is a recitation of intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the

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claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim and as discussed above, the man made structures are capable of being used in both normal and low salinity aqueous environments.

11. Claims 1 – 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. as applied to claims 1 - 5 and 8 - 13 above above, and further in view of Hani et al. (US 5,185,033).

As discussed in greater detail above, Matsuda et al. disclose anti-fouling compositions for various man-made structures comprising a metalized polymer A and antifouling agent such as cuprous oxide. Cu(0), biocidal zinc compounds and rosin are not present in these compositions so the compositions are substantially free of these ingredients.

Matsuda et al. does not disclose the copper biocide copper pyrithione.

Hani et al. discloses a paint or paint base composition with enhanced biocidal activity with a biocide of copper pyrithione and cuprous oxide (col 1, ln 56 – 61). In addition to the biocide, the paint composition can also contain polymers to thicken the composition, such as various celluloses, poly(vinyl pyrrolidone), or poly(ethylene-glycol) (col 2, ln 47 – 52), which read on the polymer B of instant claim 1.

It would have been obvious to the person of ordinary skill in the art at the time the invention was made to use a mixture of copper oxide and copper pyrithione as the biocide in the anti-fouling composition of Matsuda et al. The person of ordinary skill in

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the art would have been motivated to make those modifications and reasonably would have expected success because Hani et al. discloses the enhanced biocidal activity of this combination, which would also enhance the biocidal activity of copper oxide and metalized acrylic acid polymer of Matsuda et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nissa M. Westerberg whose telephone number is (571)270-3532. The examiner can normally be reached on M - F, 8:00 a.m. - 4 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Hartley can be reached on (571) 272-0616. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nissa M Westerberg/
Examiner, Art Unit 1618